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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/807,792	03/24/2004	Lichun Leigh Chen	048502.013US	4247

25461 7590 07/03/2008

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EXAMINER	
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ART UNIT	PAPER NUMBER
3726	

MAIL DATE	DELIVERY MODE
07/03/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	**Application No.** 10/807,792	**Applicant(s)** CHEN ET AL.	
	Examiner ALEXANDER P. TAOUSAKIS	**Art Unit** 3726	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 March 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19,21,22 and 24-26* is/are pending in the application.

4a) Of the above claim(s) *16-19 and 24* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15, 21-22 and 25-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-15, 21-22, and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maus et al (Pat No. 6,224,691) in view of Jha et al (Pat No. 5,366,139).

Claim 1.

Maus et al teaches a method for making a ferrous metal alloy foil which has a high oxidation resistance and high dimension stability in an automotive exhaust gas atmosphere comprising the steps of:

a) providing a first layer of a first metal material (4) *(see Figure 2)*.

b) sandwiching the first layer between at least two layers of metal materials, a first (5)

and second layer (6) to produce a sandwiched composite; *(see Figure 2 and column 2 lines 7-11)*

d) processing the finished thickness metal composite foil a honeycomb-like structure having channels for air flow *(see column 2 lines 23-25)*.

e) heating the honeycomb-like structure near or at an annealing temperature, in an air atmosphere, and heating at an annealing temperature for a period of time to cause diffusion of the first layer and the at least two layers to produce a monolithic honeycomb-like annealed alloy foil structure *(see column 2 lines 28-30)*.

f) cooling the monolithic honeycomb-like annealed alloy foil structure to room temperature; wherein the first metal material or the second metal material(s) contains iron *(note that it is inherent the honeycomb element will be cooled to room temperature for packing or for its use onto a motor vehicle)*.

Maus et al fails to teach a step of compacting the sandwiched composite to a finished thickness metal composite foil.

Jha et al teaches a step of compaction rolling a stack composite, wherein the composite comprises a layer of FeCr in between layers of aluminum *(see Figure 2 and column 2 lines 48-58)*, and a step of heat treating the layered composite at a temperature between about 900^{o}C to 1200^{o}C for up to 1 hour.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to compact roll the layered metal sheet of Maus et al, as taught by Jha et al, because it quickly and effectively compresses the layers together to form a uniform connection. Furthermore, it would have been obvious to diffuse the honeycomb

element of Maus et al, using the heating parameters of Jha et al, because it forms a composite with superior corrosion and oxidation resistance at high temperature *(see Jha et al column 2 lines 15-19)*.

Claim 2.

Maus et al teaches the method of claim 1, wherein the first metal material comprises iron and chromium *(see column 2 lines 8-9)*.

Claims 3-4

Maus et al teaches the method of claim 2, but fails to teach a Cr content of about 16 wt% to about 24 wt% and fails to teach a first metal material selected from stainless steel 430, 434, and 446.

Jha et al teaches layer of FeCr, made from stainless steel 430, 434, or 446 with a Cr content of 16 to about 24 wt% *(see Jha et al column 2 line 63)*.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the first layer of Maus et al of stainless steel 430, 434 or 446 with a Cr content of about 16-24 wt%, as taught by Jha et al, because it will provide increased oxygen corrosion resistance *(see Jha et al column 3 lines 7-12)*.

Claim 5.

Maus et al teaches the method of claim 2, wherein the second metal material comprises aluminum *(see Maus et al column 2 line 9)*.

Claim 6.

Maus et al teaches the method of claim 5, wherein the aluminum is essentially pure aluminum or an aluminum alloy *(see Maus et al column 2 line 9)*.

Claim 7.

Maus et al teaches the method of claim 1, wherein the first metal material is FeCr and the second metal material is aluminum *(see Maus et al column 2 lines 8-10, and note that iron is the main element in steel)*.

Claim 8.

Maus/Jha et al teach the method of claim 7, wherein the annealing temperature is from about 900° C to about 1,200° C *(see Jha et al column 3 lines 40-44)*.

Claim 9.

Maus/Jha et al teach the method of claim 8, wherein the period of time for heating is between about 10 minutes and about 120 minutes *(see Jha et al column 3 lines 43-44)*.

Claims 10-11.

Maus/Jha et al teach the method of claim 9, wherein a monolithic FeCrAl alloy is formed *(see Maus et al column 2 lines 6-11 and column 2 lines 20-25)*, but fails to teach a step wherein a pre-oxidized aluminum surface is formed thereon.

Jha et al teaches a step wherein a pre-oxidized aluminum surface is formed on top of the FeCrAl composite *(see Jha et al column 3 lines 61-64)*.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form a pre-oxidized aluminum surface onto the composite layer of Maus et al, as taught by Jha et al, because it will improve corrosion and oxidation resistance.

Claim 12-13

Maus/Jha et al teach method of claim 7 further, wherein the annealing temperature is between about 900° C and 1,200° C and the honeycomb-like structure is heated, but fail to teach heating for about 2 hours at the annealing temperature *(see Jha et al column 3 lines 38-46)*.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to anneal the honeycomb structure of Maus et al for about 2 hours because the annealing time directly depends on the thickness of material, and a 2 hour annealing time will diffuse a honeycomb structure of a larger thickness, allowing for a stronger and more rigid structure.

Claims 14-15.

Maus/Jha et al teach the method of claim 13, wherein a monolithic FeCrAl alloy is formed *(see Maus et al column 2 lines 6-11 and column 2 lines 20-25)*, but fails to teach a step wherein a pre-oxidized aluminum surface is formed thereon.

Jha et al teaches a step wherein a pre-oxidized aluminum surface is formed on top of the FeCrAl composite *(see Jha et al column 3 lines 61-64)*.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form a pre-oxidized aluminum surface onto the composite layer of Maus et al, as taught by Jha et al, because it will improve corrosion and oxidation resistance.

Claim 21.

Maus et al teaches a process of making a ferrous metal substrate catalytic converter comprising the steps of: a) providing a first layer of a first material selected from the group consisting of chromium containing ferrous metals or aluminum containing materials *(see column 2 lines 5-10)*;

b) sandwiching said first layer between a first and second layer of a second material selected from the group consisting of chromium containing ferrous metals or aluminum containing materials not chosen for the first material thereby producing a sandwiched composite *(see Figure 2 and column 2 lines 7-11)*;

d) processing the finished thickness metal composite foil with a flat foil into a honeycomb-like structure having channels for air flow *(see* Figure 3, column 5 lines 35-42, where it discloses a flat foil (2) being processed with the sandwiched material (3) and see *column 2 lines 23-25, where it discloses a honeycomb-like structure having channel for air flow)*.

e) heating the honeycomb-like structure near or at an annealing temperature, in an air atmosphere, at an annealing temperature for a period of time to cause diffusion of said one or more second metal materials into said first metal materials to produce a monolithic honeycomb-like annealed alloy foil structure *(see column 2 lines 28-30)*; and

f) cooling the furnace and the monolithic honeycomb-like annealed alloy foil structure to room temperature *(note that it is inherent the honeycomb element will be cooled to room temperature for packing or for its use onto a motor vehicle)*;

Maus et al fails to teach a step of compaction rolling the sandwiched composite to a finished thickness metal composite foil and wherein the structure has a pre-oxidized surface comprising Al-oxide.

Jha et al teaches a step of compaction rolling a stack composite, wherein a layer of FeCr is surrounded by layers of aluminum, and a step of forming a layer of aluminum oxide onto the metal surface *(see Figure 2 and column 2 lines 48-58)*.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to compact roll the layered metal sheet of Maus et al, as taught by Jha et al, because it quickly and effectively compresses the layers together to form a uniform connection. Furthermore, it would have been obvious to form a thin layer of aluminum oxide onto the honeycomb element of Maus et al, as taught by Jha et al, to prevent further oxidation of the honeycomb element, thereby protecting it from weathering or damage *(see Jha et al column 3 lines 67-68)*.

Claim 22.

Maus/Jha et al teach the process of claim 21, wherein the first material is FeCr and wherein a second material is aluminum oxide *(see Jha column 2 lines 48-58)*.

Claim 25.

Maus et al teaches a process of making a ferrous metal substrate catalytic converter comprising the steps of:

a) sandwiching said first layer between a first and second layer of a second material to produce a multilayer composite *(see Figure 2 and column 2 lines 7-11)*;

c) processing the finished thickness metal composite foil with a flat foil into a honeycomb-like structure having channels for air flow *(see* Figure 3, column 5 lines 35-42, where it discloses a flat foil (2) being processed with the sandwiched material (3) and see *column 2 lines 23-25, where it discloses a honeycomb-like structure having channel for air flow)*.

d) heating the honeycomb-like structure near or at an annealing temperature, in an air atmosphere to produce a monolithic honeycomb-like annealed alloy foil structure *(see column 2 lines 28-30)*; and

f) cooling the furnace and the monolithic honeycomb-like annealed alloy foil structure to room temperature and wherein the first or second material contains iron *(see column 2 line 9 and note that it is inherent the honeycomb element will be cooled to room temperature for packing or for its use onto a motor vehicle)*;

Maus et al fails to teach a step of compaction rolling the sandwiched composite to a finished thickness metal composite foil and wherein the structure has a pre-oxidized surface comprising Al-oxide.

Jha et al teaches a step of compaction rolling a stack composite, wherein a layer of FeCr is surrounded by layers of aluminum, and a step of forming a layer of aluminum oxide onto the metal surface *(see Figure 2 and column 2 lines 48-58)*.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to compact roll the layered metal sheet of Maus et al, as taught by Jha et al, because it quickly and effectively compresses the layers together to form a uniform connection. Furthermore, it would have been obvious to form a thin layer of

aluminum oxide onto the honeycomb element of Maus et al, as taught by Jha et al, to prevent further oxidation of the honeycomb element, thereby protecting it from weathering or damage *(see Jha et al column 3 lines 67-68)*.

Claim 26. Maus/Jha et al teach the method as claimed in claim 25, wherein the step (d) is the only step necessary for producing the laminated structure *(see Abstract)*.

Response to Arguments

Applicant's arguments filed 3/24/2008 have been fully considered but they are not persuasive.

Claim 1: Applicant argues that Maus/Jha et al fail to teach or suggest heating the honeycomb—like structure near an annealing temperature in an air atmosphere for a period of time to cause diffusion of the first layer and the at least two layers to produce a monolithic honeycomb-like annealed alloy foil structure. This is not found persuasive because Maus et al teaches heating the stacked layers to substantially homogenize the material by diffusion *(see column 2 lines 28-30).*

Claim 13: Applicant argues that Maus/Jha et al fail to teach or suggest annealing for about 2 hours. This is not found persuasive because a substantially thicker honeycomb body may be produced, requiring a longer heat treatment to form a composite structure. Therefore depending on the thickness of the individual layers

used, a longer heat treatment including that of about 2 hours may be used to diffuse the metal layers together, and would have been obvious to one of ordinary skill in the art.

Claim 21: Applicant argues that Maus/Jha et al fail to teach or suggest a composite bound to a flat foil. This is not found persuasive because Maus et al teaches the composite (3) bound to a flat foil (2) *(see Figure 3 and column 5 lines 37-42)*.

Claim 25: Applicant argues that Maus/Jha et al fail to teach or suggest a method in which the honeycomb-like structure is heated in an air atmosphere at an annealing temperature so to produce a monolithic honey-like annealed alloy foil with a pre-oxidized surface. This is not found persuasive because Jha et al teaches forming a layer of aluminum oxide onto a composite performing a heating operation *(see column 3 lines 61-66)*.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALEXANDER P. TAOUSAKIS whose telephone number is (571)272-3497. The examiner can normally be reached on M-F 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Bryant can be reached on (571) 272-4526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Examiner
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